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Is there a relation between money, measured by inflation or interest rates, and unemployment? According to Aleksander Berensten (University of Basel), Guido Menzio and Randall Wright (University of Pennsylvania) -- co-authors of a recent paper on "Inflation and Unemployment in the Long Run" -- there is a strong positive relation. Wright, who is professor of economics at Wharton, presented a seminar based on the paper at the Singapore Management University's School of Economics.

To investigate how monetary factors explain labour market behaviour, the authors developed a model based on microeconomic foundations which incorporates labour and goods markets. They found the answer depends on two main factors: elasticity of money demand, and the value for leisure.

Using conservative assumptions, money accounts for some but not much of long-run unemployment. About 20% of the increase in the 1970's stagflation is explained by monetary policy alone. Using less conservative assumptions, money accounts for between 68% and 86% of the increase in unemployment during periods of stagflation.

Two fundamental propositions from monetary economics are the quantity equation and the Fisher effect. The quantity equation says inflation moves one-for-one with the growth of the money supply. The Fisher effect says the nominal interest rate moves one-for-one with inflation.

Inflation vs Money Supply

While they don't always hold in the short-run, are they more likely to in the long-run? To investigate this question, Lucas (1980) plotted inflation vs. M1 (cash plus demand deposits) from 1955 to 1975. The authors reproduce this and extend it to 2005.

The basic regression line slopes upward. The fit is not perfect since there is likely to be some short-run "noise". Lucas removed the noise by using moving averages as filters. The filters were strengthened by lengthening the period covered by the moving averages. The authors do the same and filter their data by using increasingly broad definitions of money to remove "noise". The result is a distinct pattern in which the quantity equation appears.

The authors repeat this procedure for the Fisher equation, plotting inflation against nominal interest rates. Again, they succeed in filtering out the noise. The expected positive relation emerges.

The conclusion from Lucas as well as the authors is that the quantity theory of money and the Fisher equation hold up well for long-run data. The authors use the same technique to discover the long-run relation between inflation and unemployment and find a long-run positive relation.

Of course, this is contrary to predictions of the Phillips curve which claims the data shows unemployment negatively related to inflation. The difference may be explained by the long-run vs the short-run. It is likely that the Phillips curve traces out a short-run phenomenon. The mechanism is demand-pull type of inflation. In boom times, high demand pulls up prices and lowers unemployment, hence the negative relation traced out by the Phillips curve.

In the long-run, however, the effect is the opposite. High demand produces high inflation. But inflation is a component of interest rates so interest rates also rise. This slows economic growth and boosts unemployment, accounting for the long-run positive relation between inflation and unemployment.

Which is correct? Well, both are. While the short-run relation may be more intuitive, the long-run relation is likely more important since it explains a more permanent phenomenon. An added insight is that inflation is often due to growth in the money supply. Therefore, if the relation between inflation and unemployment is positive, the relation between the money supply and unemployment is too. The policy implication is that large boosts in the money supply will increase inflation and unemployment.

A major contribution by the authors is that the positive relation between money supply, inflation, interest rates and unemployment is supported in a theory which they have developed.

The Model

The authors' model is able to show how much of an increase in unemployment one would expect from a given

increase in inflation or nominal interest rates – such as during the stagflation in the 1970's. The answer turns on two parameters, the value of leisure and money demand elasticity.

The authors note that, "For a conservatively low estimate of the demand for money demand elasticity … we account for only 20% of the increase in the raw unemployment series and 13% of the filtered unemployment, during stagflation. This is nothing to scoff at, but obviously does have plenty of room for other factors, including productivity, demographics, fiscal policy, etc."

The authors then set the value of leisure slightly higher. In that case, the model accounts for nearly all of trend unemployment during the period. It shows that conservative parameter estimates imply monetary factors account for some but not the majority of unemployment. It is possible to account for much more unemployment by stretching the parameters slightly.

Leisure and elasticity of money demand are the two most important factors accounting for unemployment in the model. According to the authors, "We conclude that while conservative parameter estimates imply monetary factors account for some but not the majority of trend unemployment, one does not have to stretch parameters too far to account for much more."

The Results

The model directs its focus on the effects of changes in unemployment caused by monetary policy. The case of low money demand elasticity implies that monetary policy alone can account for a little but not much of the changes in unemployment over the past 50 years. It shows the correct direction but not the big swings in unemployment that is observed in the data. One can consider the run up in unemployment over the two worst stagflation periods in the first quarters of 1972 and 1982.

This version of the model (low money demand elasticity) accounts for only part of the increase in unemployment during the period. Over the 10 years period (1972-1982) the model predicts only 8% of unemployment compared to the actual 41% increase. In other words, the model shows only 20% of the observed increase.

Similarly, the model accounts for only 12% and 14% of the observed increase in low and high filtered unemployment during the episode. It again shows that with low money demand elasticity, the model accounts for some but not all the unemployment observed.

The model's results show that the initial impact of an increase in inflation is to reduce the real money supply. It reduces incomes and, ultimately, decreases employment. The size of the effect of inflation on the real money supply and hence revenues depends on the money demand elasticity. The size of the effect of revenues on entry to the labour market, and hence the unemployment rate, is then determined by the value of leisure. Both a bigger money demand elasticity or a bigger value of leisure generate similar effects. Both make unemployment respond more to monetary policy.

Of course, there is more to explaining long-run unemployment than the demand for money and demand for leisure -- such as productivity, demographics, taxes, etc. It still interesting, however, that money has a role to play. As the authors point out, "These results suggest that monetary factors may be important for labour market outcomes, not only theoretically but also quantitatively. Future research could attempt to hone these numerical results and explore other quantitative and theoretical questions in the general framework."

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